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Technology succeeds at Failure

IS helps Failure Analysis discover why things go 'boom' in the night

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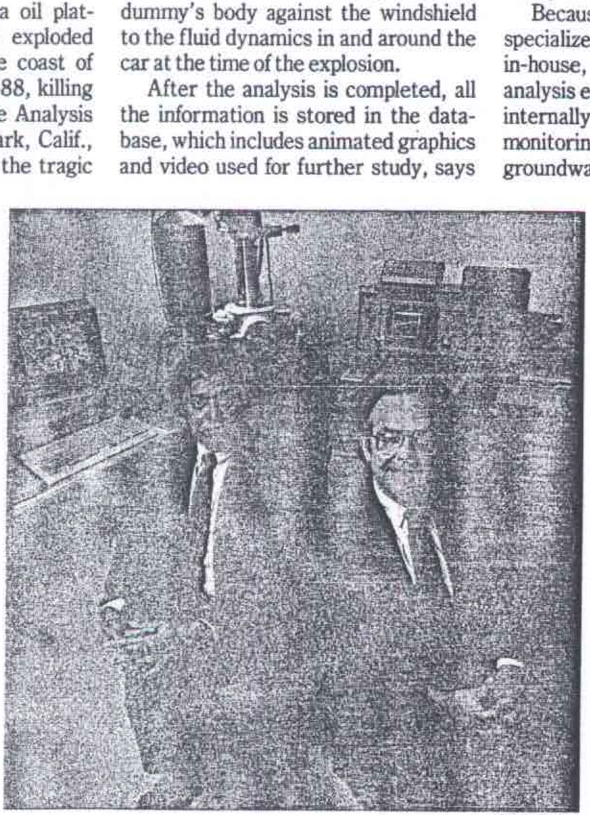
CW STAFF

After the North Sea oil platform Piper Alpha exploded and burned off the coast of Scotland in July 1988, killing 167 people, Failure Analysis Associates, Inc. in Menlo Park, Calif., was called in to investigate the tragic accident — and to apply a lot of information technology in doing so.

Failure Analysis is a research firm that analyzes explosions of cars, trains, airplanes and helicopters, as well as engine failures, breakdowns in nuclear power plants and missile systems and other engineering disasters. The $60 million firm also tests consumer products for possible defects before they reach the market.

"Computers are used for about 90% of everything we do," says Roger McCarthy, chairman of Failure Analysis. For example, the company's 15 years of research into automobile accidents is stored in an object-oriented database containing more than 50 million automobile accident records. The company claims its database is the largest single collection of accident information in the U.S.



Cindy Charles

Failure Analysis' *Subbaiah and McCarthy see leading-edge technology as vital to their business*

Dummy crash

When conducting an analysis of a car crash or when testing a car's durability by test-crashing it (which accounts for almost 50% of the company's business), the company uses specially designed computers attached to dummies and to the automobile. The computers measure everything going on during the test crash, from the impact of the dummy's body against the windshield to the fluid dynamics in and around the car at the time of the explosion.

After the analysis is completed, all the information is stored in the database, which includes animated graphics and video used for further study, says Malladi Subbaiah, senior vice president at Failure Analysis and head of the computer systems department.

At Failure Analysis' 160-acre test and engineering center in Phoenix, engineers imitate an accident by reconstructing and blowing up the product or site. To record the accident or failure as accurately as possible, engineers use high-definition video and other high-technology equipment in the hope of finding the reason the usually bizarre or unexpected failure occurred.

Because Failure Analysis' work is so specialized, most software is developed in-house, as is some high-technology analysis equipment for certain uses. An internally developed, solar-powered monitoring unit was used to test the groundwater in a small Midwestern town located near a nuclear facility, for example.

"One of the things that distinguishes us from our competitors is that everything we study is backed up by scientific facts and figures," principal engineer Paul Johnston says.

Needle in a haystack

Failure Analysis used a scientific formula called finite element analysis to determine that a leak in a 22-ft wide Pacific Gas & Electric Co. pipe was the result of a crack.

While it may seem easy, Johnston says that looking for a crack in such a large underground pipe is like looking for a needle in a haystack.

"This type of work is perfect for computers . . . in fact, it couldn't be done without computing technology," Johnston says.

Founded in 1967 by five engineers with just $500 in capital, Failure Analysis went public in 1988 and reported revenue of almost $60 million in 1990. With no advertising budget, the company relies on its engineering expertise and word of mouth for all of its business.

While Failure Analysis' reputation

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Failure Analysis

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for accuracy in its research has spread throughout the years, it was the advent of the personal computer that really gave the company the boost it needed to expand, McCarthy says.

"When I first got to this company in 1978, there wasn't a single computer here," he says. "About half the staff used computers for scientific work back then, but they used Stanford University's IBM 3081 mainframe for everything."

It wasn't until 1982 that Failure Analysis purchased its first computer, a Digital Equipment Corp. VAX 11/750 with 16M bytes of memory, McCarthy says.

Now the company has more than one computer per employee and has invested almost $11 million in hardware and software. Failure Analysis has more than 500 employees throughout its Menlo Park headquarters, a test site in Phoenix and several offices in the U.S. and abroad.

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Desktop systems installed at headquarters include hundreds of Intel Corp. 80386- and I486-based IBM Personal Computers and compatibles, Apple Computer, Inc. Macintosh computers, Hewlett-Packard Co. workstations and Sun Microsystems, Inc. Sparcstations.

There is also a Vaxcluster with five VAX systems, an IBM 3083 mainframe and a total of 64G bytes of hard-disk storage. Much of the memory on the IBM 3083, Subbaiah says, is used as storage space for Failure Analysis' clients using the company's newest service, a customized computer information system.

This application allows Failure Analysis to act as a specialized IS management company. Failure Analysis takes a client's data and organizes it with cross-references for every piece of data so the client can find virtually anything with a one-word search, Subbaiah says.

"It is not uncommon for our system to have 100 clients accessing their customized systems that are stored in our IBM mainframe at any given time," McCarthy says. Clients who subscribe to the special program can also access information on the company's internal databases, which include 15 years of data in some cases.

Because Failure Analysis depends on computers for virtually everything it does, it is perhaps more willing than most companies to rely solely on computers to get the job done. That way of thinking has led to some pretty ambitious goals for IS. McCarthy says that within five years, he would like to eliminate paper altogether.

"We're toying with the idea of having a high-end workstation — possibly reduced instruction set computing-based — on every employee's desk, connected to a centralized network with shared data resources," he says. "Each of the networks in our offices would then be connected to an overseeing mainframe center.

"Our philosophy here," McCarthy adds, "is that if it's on paper, it's lost."